Maternal Media Device Use during Breastfeeding and Infants' Social and Emotional Development

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Note: Accepted for publication in *Breastfeeding Review*

Abstract

Breastfeeding has demonstrable positive effects on infants' social and emotional development. This might be due to various behaviors occurring during breastfeeding such as maternal sensitivity and responsiveness to infant's cues, mutual gaze, and mother-infant symphony. However, these intricate behavioral patterns might be hindered by maternal use of media devices during breastfeeding. Here, I review the recent evidence on maternal use of media devices during breastfeeding and its effects on mother-infant interaction, mother-to-infant bonding, and infant's attachment. The evidence suggests that media device use during breastfeeding increases maternal distraction and lowers the maternal sensitivity and responsiveness towards an infant, behaviors that are foundational blocks of infant's social and emotional development.

Keywords: breastfeeding, media devices, mother-infant interaction, mother-to-infant bonding, attachment.

1. Introduction

Breastfeeding has a crucial role in infants' nutrition contributing to various health benefits for both the infant and the mother (Aune et al., 2014; Bowatte et al., 2015; Choi et al., 2017; Duijts et al., 2010; Rossiter et al., 2015). Besides the effects of breastfeeding on physical and cognitive development (Belfort et al., 2013; Bowatte et al., 2015; Heikkilä et al., 2017), it has been proposed that mother-infant interactions during breastfeeding play a critical role in infants' social and emotional development as well (Fergusson & Woodward, 1999). Specifically, breastfeeding might support mother-to-infant bonding (Else-Quest et al., 2003) and infants' secure attachment to parents (Britton et al., 2006; Fergusson & Woodward, 1999; Gibbs et al., 2018). The precise mechanisms for this might be linked to the various behaviours occurring during breastfeeding that could promote mother-to-infant bonding. Some of these are responsiveness to infant hunger cues, interaction cues (Brown & Arnott, 2014; Kuzela et al., 1990), mother-infant synchrony (Baker & McGrath, 2011), and mutual gaze (Lavelli & Poli, 1998). Hence, breastfeeding itself provides an opportunity for mothers and infants to engage in interactional patterns that facilitate infants' bonding and attachment, which might have long lasting consequences on infants' social and emotional development.

Despite the enormous benefits of breastfeeding (Victora et al., 2016; WHO, 2003), the activity of breastfeeding and its potential benefits might be compromised in recent years with the ubiquitous presence of various media devices in our daily lives. Indeed, a growing number of mothers are reporting that they are using media devices even during breastfeeding (Tomfohrde & Reinke, 2016; Ventura & Teitelbaum, 2017). This usage of media devices during breastfeeding might affect mother-infant interaction disrupting the important behaviors that affect development of mother-to-infant bonding and attachment. Hence, the main goal of this paper is to review the current evidence on the media device use during

breastfeeding and infant and mother-infant outcomes. Specifically, the first aim of the paper is to review the rationale for media device use during breastfeeding. The second aim is to provide a review of studies that assess the effects of media device use during breastfeeding on mother-infant interaction, mother-to-infant bonding, and infant's attachment. Before proceeding to the overview of current evidence, the next section describes the methodology used in the selection of relevant studies.

2. Method

Following the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) protocol (Page et al., 2021), the search for relevant studies was conducted (see Figure 1 for PRISMA flowchart). This consisted of search for relevant papers in databases, abstract screening, full text retrieval and screening. All document type were included if they fulfilled the following criteria: assessed the maternal use of media devices during breastfeeding and its effect on infant's and mother-infant outcomes. The systematic database search was conducted using Google Scholar and PubMed databases with the keywords "media device use during breastfeeding" and "screen devices use during breastfeeding". Additionally, citations in relevant papers were checked for additional studies. A total of 37 studies was retrieved, of which 8 were deemed eligible after application of inclusion criteria (see Table 1 for details on included studies). Hence, the final sample includes eight studies, of which seven were peer-reviewed publications and one was the master's thesis (Tharmaratham, 2019).

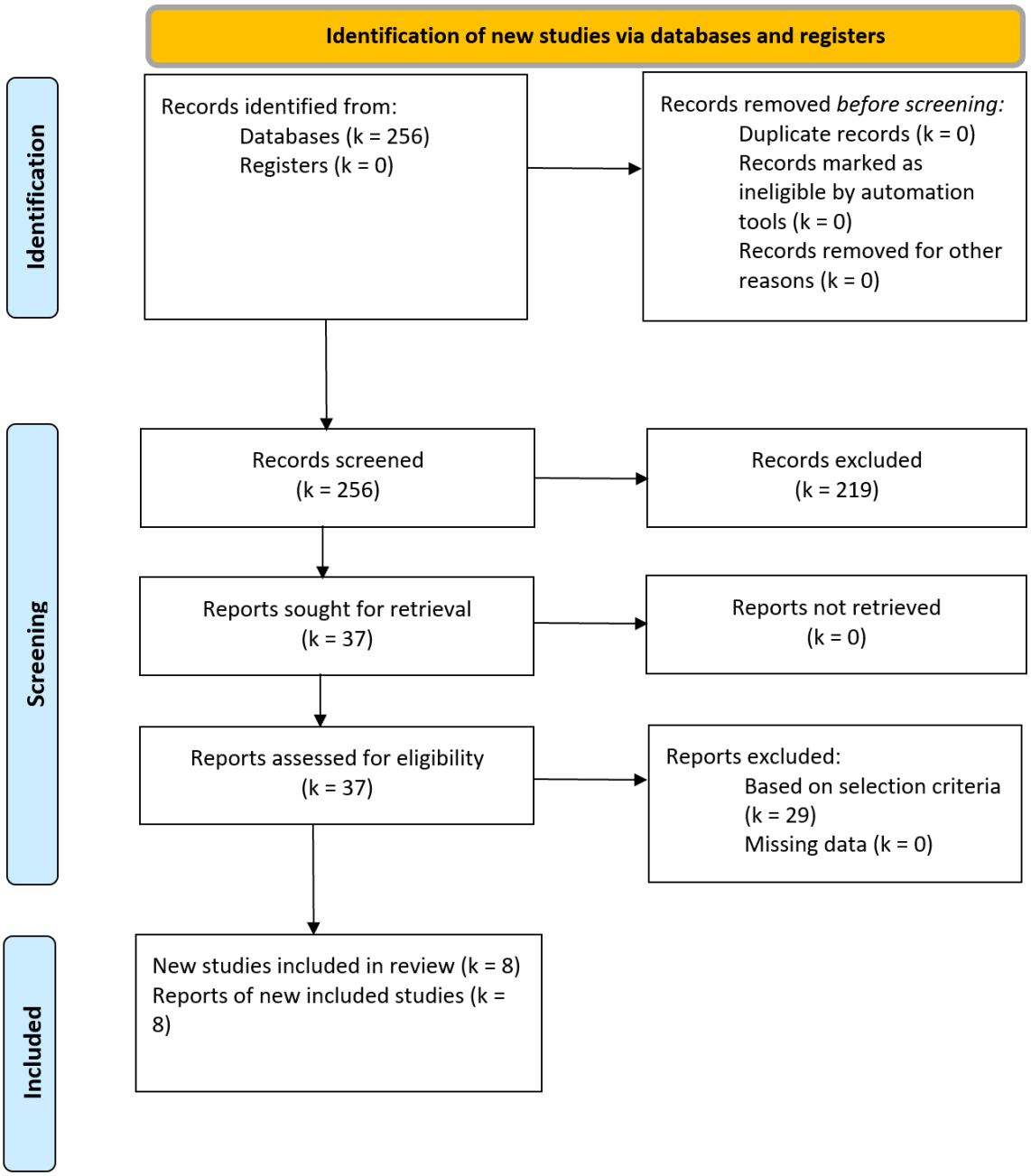

Figure 1. PRISMA flowchart of the systematic literature search.

Table 1.

Overview of studies included in the systematic literature review depicting the study type, number of participant (N), measure of media device use, and the study focus (outcome measure)

Study	Study type	N	Measure of media device usage	Study focus (outcome measure)
Coyne et al. 2022	Cross-sectional (study 1), longitudinal (study 2)		Focus group (study 1); Maternal reports (study 2)	Rationale for media device use (Study 1); attachment, mother-infant relationship, and mother-infant dysfunction (Study 2)
Inoue et al., 2021	Cross-sectional		Experimental laboratory study	Bonding, mother-infant interaction, and mothers' visual responsiveness to infants' cues
Inoue et al., 2022	Longitudinal		Maternal reports	
Nomkin & Gordon, 2021	Cross-sectional	20	Experimental laboratory study	Gaze patterns, physiological responses
Tharmaratham, 2019	Cross-sectional	13	Semi-structured interviews	Rationale for media device use
Tomfohrde & Reinke, 2016	Cross-sectional	309	Maternal reports	Rationale for media device use
Ventura et al., 2019	Cross-sectional	25	Experimental laboratory study	Mother-infant interaction
Gutierrez & Ventura, 2021	Cross-sectional	332	Maternal reports	Infant' temperament, mother-to-infant attachment

3. Rationale for Media Device Use during Breastfeeding

Data from several studies (Coyne et al., 2022; Inoue et al., 2021; Tharmaratnam, 2019; Tomfohrde & Reike, 2016) suggest the two main categories of reasons for maternal media device use during breastfeeding. The first category - *productivity* – consists of: multitasking, gathering information about an infant and breastfeeding, using a breastfeeding tracker app, working, and breastfeeding time being allocated time for media device use. The

second category - *coping strategies* - includes the following reasons: distraction from the pain and/or frustration of breastfeeding, entertainment, connecting with other adults, seeking emotional support. Furthermore, maternal media device use varied due to specific factors. These were infant's age, parity, and the time of the day (Coyne et al., 2022; Tharmaratnam, 2019). Specifically, the use of media devices during breastfeeding was greater for younger than older infants, to later born than to first born infants. Regarding the time of the day, findings are contradictory with one study showing greater use during the day compared to the night (Coyne et al., 2022) and another finding greater usage during night than day (Tharmaratnam, 2019). Hence, the rationale for media device use during breastfeeding depends on various factors and varies due to mothers' individual needs, contextual factors (e.g., time of the day) and infant's characteristics.

4. Media Device Use during Breastfeeding and Mother-Infant Interaction

So far evidence suggests that maternal media device use during breastfeeding negatively affects mother-infant interaction. An experimental laboratory study conducted by Ventura et al. (2019) demonstrated that mothers engaged significantly 1.14 times less (around 6 words less) in cognitive growth fostering behaviors when watching a 22-minute TV show during breastfeeding, compared to no media device use. Given that cognitive growth fostering behaviors, such as use of infant-directed speech, encouragement of infant exploration and learning, and engagement of an infant in cognitively stimulating ways (Oxford & Findlay, 2015) contribute to infants' language and cognitive development (Bornstein & Tamis-LeMonda, 1989; Fernald, 2000), these findings are concerning. Other studies confirmed that media device use during breastfeeding increases maternal distraction and mother-infant dysfunction (Coyne et al., 2022; Inoue et al., 2022). Hence, the media

device use during breastfeeding might have detrimental effects on the quality of mother-infant interaction.

5. Media Device Use during Breastfeeding and Mother-to-infant Bonding and Infant's Attachment

This section reviews the evidence on maternal device use during breastfeeding and its effect on mother-to-infant bonding and infant's attachment. Mother-to-infant bonding refers to the emotional bond established between a mother and an infant through repeated mother-infant interactions (Klaus et al., 1995). Attachment styles represent the enduring beliefs and tendencies around interpersonal relationships that develop through caregiver-infant interactions (Ainsworth, 1978; Bowlby, 1982). These attachment styles are defined as secure versus various forms of insecure attachment (e.g., anxious, avoidant, dismissive, preoccupied etc.) and they exhibit stability during the lifespan (Ainsworth, 1978; Bowlby, 1982). Breastfeeding provides an opportunity for mother and infant to engage in repeated interactions on a daily basis which promote an establishment of mother-to-infant bonding and infant's secure attachment to parents (Britton et al., 2006; Else-Quest et al., 2003; Fergusson & Woodward, 1999; Gibbs et al., 2018; Kennell & McGrath, 2005; Kim et al., 2011). Specifically, different behaviors during breastfeeding might facilitate the development of mother-to-infant bonding and infant's secure attachment. These behaviors are maternal sensitivity and responsiveness to infant's cues (Brown & Arnott, 2014), mutual gaze (Lavelli & Poli, 1998), mother-infant synchrony (Baker & McGrath, 2011), and infant's bids to mother (Reyna, 2012). However, maternal, and consequently infant's distraction during breastfeeding might affect these behaviors. This, in turn, might hinder the establishment of strong mother-to-infant emotional bonds and infant's secure attachment. Issues with mother-to-infant bonding might have serious adverse effects on mother-child relationships, parenting behavior, and child's physical and cognitive development (Mäntymaa et al., 2003; Muzik et

al., 2013; Noorlander et al., 2008). Furthermore, an infant's secure attachment is related to greater social competence with peers, fewer aggressive behavior and fewer internalising symptoms during childhood (Groh, 2021). Therefore, an establishment of strong bonding and secure attachment during infancy is of critical importance for an infant's subsequent social, emotional, physical, and cognitive development.

Previous evidence suggests that media device use during breastfeeding does not affect mother-to-infant bonding (Inoue et al., 2021, 2022) nor infant's secure attachment (Coyne et al., 2022). However, it negatively affects various maternal and infant's behaviors during breastfeeding that are important for establishment of solid mother-to-infant bonding and infant's secure attachment. Regarding maternal behaviors, a prolonged use of a mobile phone during breastfeeding might limit the mother's ability to visually respond to an infant's bids for her attention (Inoue et al., 2022). Furthermore, mothers exhibited a lower sensitivity to infants' cues while watching a TV show compared to no media device use during breastfeeding (Ventura et al., 2019). Similarly, mothers showed a decreased eye gaze towards an infant while using smartphones compared to no device condition (Nomkin & Gordon, 2021). Additionally, media devices used during interactions with infants (including breastfeeding) negatively affected mother-to-infant attachment and resulted in greater hostility towards motherhood (Gutierrez & Ventura, 2021). Regarding the infant's behavior, the media device used during breastfeeding by mothers who usually do not engage in this behavior might decrease the infant's bids and responsiveness towards the mother (Ventura et al., 2019). It might also induce an increase in negative affectivity in infants (Gutierrez & Ventura, 2021). Thus, research evidence suggests that media device use during breastfeeding negatively affects maternal responsiveness and maternal sensitivity towards an infant, which are the important constituents of mother-to-infant bonding and infant's secure attachment

(Baker & McGrath, 2011; Pearson et al., 2011). It also has adverse effects on infant's responsiveness and infant's bids towards the mother as well as infant's temperament.

Given the importance of maternal responsiveness and sensitivity not only for mother-to-infant bonding but also for other areas of development (Bornstein & Tamis-LeMonda, 1989; Fuertes et al., 2022; Prime et al., 2020), lower quality or absence of these, if repeated through interactions, might have long-term adverse effects on several areas of development. Furthermore, a decreased maternal responsiveness and sensitivity might in long-term affect an infant's attachment style. Hence, media device use during breastfeeding might affect both maternal and infant's behaviors that promote the formation of strong mother-to-infant bonds and infant's secure attachment.

6. Conclusions and Future Directions

The goal of this paper was to review the evidence regarding media device use during breastfeeding and its effects on mother-infant interaction, mother-to-infant bonding, and infant's attachment. The results suggest that the use of media devices during breastfeeding negatively affects the quality of mother-infant interaction. On the other hand, results indicate that maternal media device use during breastfeeding does not affect mother-to-infant bonding and infant's attachment. However, it does negatively affect both maternal and infant behaviors during breastfeeding that are crucial in the development of mother-to-infant bonding and infant attachment (Baker & McGrath, 2011; Brown & Arnott, 2014; Kuzela et al., 1990; Lavelli & Poli, 1998; Reyna, 2012). Specifically, maternal responsiveness and sensitivity towards an infant were hindered by the use of media devices during breastfeeding.

Given the widespread use of media devices in our daily lives which might be accentuated during the COVID-19 pandemic, it is of critical importance to examine if this activity during breastfeeding might hinder important developmental processes. Furthermore,

future research should consider various media device-related factors as well as maternal factors and their effects of infant's outcomes.

With regards to media device-related factors, future studies should consider two factors. The first factor is the type of media devices. It is possible that different types of media devices might lead to different levels of distraction during breastfeeding. This, in turn, might have diverse consequences on the mother-infant interaction. Another factor to consider is the type of activity. It could be that different activities even on the same type of device might lead to different levels of engagement. For example, checking the time or notifications or mobile phone might lead to less engagement with the device and better ability to respond to infant cues, compared to attending an online meeting, reading a book/magazine/article, or texting.

Regarding the maternal factors, the first factor to consider is whether the potential reasons for usage of media devices during breastfeeding might lead to different effects on mother-infant outcomes. For example, if the main reason for media device use is to connect with others, this activity might decrease maternal stress, potentially leading to different outcomes compared to the use of media devices due to boredom or for multitasking (Wolfers, 2021; Zhang et al., 2021). The second maternal factor to assess is maternal attitudes towards media device use during breastfeeding and its potential effects. For example, if a mother considers the usage of media devices during breastfeeding a negative behaviour it might lead to the feelings of guilt and therefore stress, negatively affecting infant development (Elansary et al., 2022). In contrast, if a mother has a positive attitude towards media device use during breastfeeding and feels confident because of multitasking and being productive, it might not result in adverse outcomes.

In conclusion, this review indicates that the use of media devices during breastfeeding negatively affects the quality of mother-infant interaction. This is evident in more distractions, less maternal sensitivity and responsiveness to infant cues. Given the widespread use of media devices in our everyday lives and the well-established benefits of breastfeeding on infant development, further research on the effects of media device use during breastfeeding on infants' social and emotional wellbeing is warranted. Furthermore, this review suggests that clinicians, health care providers and governmental organisations should be informed about the potential adverse effects of the media device use during breastfeeding. This might help in providing the appropriate recommendations to the caregivers while considering each individual's circumstances.

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